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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/518,065

07/21/2005

Silvia Kronmueller

10191/3686

2716

26646

7590

11/09/2007

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EXAMINER

SMOOT, STEPHEN W

ART UNIT

PAPER NUMBER

2813

MAIL DATE

DELIVERY MODE

11/09/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/518,065

Applicant(s)

KRONMUELLER ET AL.

Examiner

Stephen W. Smoot

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2004 and 21 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-22, 24-26, 28-33 and 39-44 is/are rejected.
- 7) ☒ Claim(s) 23, 27, 34-38, 45 and 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12-13-04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action is in response to application papers received on 13 December 2004, which includes a preliminary amendment and substitute specification that have been entered.

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Component that Includes an Anchoring Element for Mechanically Connecting a Fixed Element Corresponding to a Component Structure Formed in a Silicon Layer to an Underlying Substrate and Method for Its Manufacture.

2. The disclosure is objected to because of the following informality:

On page 8, line 7 of the substitute specification, change "epitactically" to --epitaxially-- to correct spelling.

Appropriate correction is required.

Claim Objections

3. Claim 36 is objected to because of the following informality:
- In claim 36, line 2, change "epitactically" to --epitaxially-- to correct spelling.
- Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:
- The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claim 32 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 32 takes on an unreasonable degree of uncertainty per MPEP section 2173.03 because it is inconsistent with the specification. That is, claim 32 requires that anisotropic etching be used to undercut an edge region of the recess in the silicon layer. However, the specification indicates that isotropic etching of the sacrificial layer is actually performed to undercut the edge region of the recess of the silicon layer (see substitute specification, page 6, lines 9-14).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 20-21, 29-31, 33, 40, 42-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Nowak (WO 95/12214 A1).

Referring to Figs. 1-5 and page 2, line 27 to page 5, line 14, Nowak discloses a field effect transistor structure and its method of manufacture. As shown in Fig. 5, the structure includes a silicon base wafer (10) (i.e. a supporting substrate), an isolation oxide layer (11) (i.e. a sacrificial layer) over the wafer (10), a silicon layer (12) over the oxide layer (11), the field effect transistor (14, 15, 44) (i.e. a component structure) formed in the silicon layer (12), a polysilicon pillar (22) (i.e. an anchoring material) that extends through the silicon layer (12) and the oxide layer (11) to the wafer (10), and a source or drain electrode (44) (i.e. a fixed element of the transistor) mechanically connected to the wafer (10) via the pillar (22). These are all of the structural limitations as set forth in claims 20-21, 40 of the applicant's invention.

As shown in Fig. 2, a photoresist mask (16) is used to anisotropically etch a trench (19) through the silicon layer (12) and the oxide layer (11) to expose the substrate (10). As shown in Figs. 3-4, the trench (19) is then filled with polysilicon layer

(22) and the excess polysilicon (22) is removed by etching to form the pillar (22). These process limitations when combined with the above structural limitations include all of the limitations as set forth in claims 29-31, 33, 42-44 of the applicant's invention.

8. Claims 20, 22, 24-26, 28, 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Van Dalen (WO 01/71815 A2).

Referring to Figs. 1-2 and page 5, line 25 to page 9, line 8, Van Dalen discloses a field effect transistor structure that includes a supporting substrate (10), a silicon layer (11) formed over the substrate (10), the transistor (i.e. a component structure) formed in the silicon layer (11), an insulating layer (23) (i.e. an anchoring material) that extends through the silicon layer (11) and connects to the substrate (10), a low resistance region (21) (i.e. a fixed element of the transistor and also an electrode) mechanically connected to the substrate (10) via the insulating layer (23), the insulating layer (23) can be silicon dioxide or silicon nitride (see page 7, lines 26-28), dielectric regions (30) (i.e. a coating) with a contact opening for a bleeder (20), and the dielectric regions (30) can be formed from silicon oxide (also see page 11, lines 24-26) (i.e. the same material as the insulating layer – 23).

These are all of the structural features as set forth in claims 20, 22, 24-26, 28, 40 of the applicant's invention.

9. Claims 20-21, 29-31, 33, 39-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnson et al. (US 5,877,521).

Referring to Fig. 2 and column 4, line 11 to column 5, line 67, Johnson et al. disclose an active pixel sensor device (i.e. a component structure) that includes a supporting substrate (14), an insulating layer (12) (i.e. a sacrificial layer) formed over the substrate (14), and a silicon layer (16) formed over the insulating layer (12), a semiconductor connector plug (18) (i.e. an anchoring material) that extends through the silicon layer (16) and the insulating layer (12) to the substrate (14), a pinning layer (24) (i.e. an electrode) and a photosensitive region (22) (i.e. fixed elements of the sensor device) mechanically connected to the substrate (14) via the plug (18). These are all of the structural features as set forth in claims 20-21, 39-40 of the applicant's invention.

The plug (18) can be formed by masking and etching to form openings, the openings can be trenches, conductively doped silicon is deposited in the openings, and excess polysilicon can be removed by chemical mechanical polishing (also see column 6, lines 54-65). These process limitations when combined with the above structural limitations include all of the limitations as set forth in claims 29-31, 33, 41-44 of the applicant's invention.

Allowable Subject Matter

10. Claims 23, 27, 34-38, 45-46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

- Claim 23 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a component that includes an anchoring element that extends through a silicon layer and through an underlying sacrificial layer to a supporting substrate, wherein the anchoring element has a barbed structure that extends in an area of the sacrificial layer to below the silicon layer;
- Claim 27 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a component that includes an anchoring element that extends through a silicon layer to a supporting substrate, wherein the anchoring element is configured to anchor an electrode and the anchoring material is electrically non-conductive, and wherein a cap diaphragm is formed on top of the component and the cap diaphragm is mechanically connected to the substrate via the anchoring element; and
- Claims 34-38, 45-46 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a method for manufacturing a component that includes making a recess that extends through a silicon layer and through an underlying sacrificial layer down to a supporting substrate, filling the recess with an anchoring material to mechanically connect a fixed element of the component to the substrate, wherein the fixed element is produced in the silicon layer, and forming a cap diaphragm on the component.

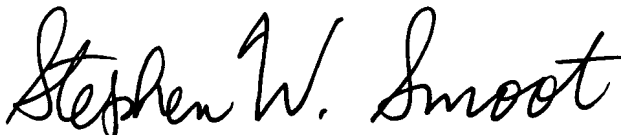
Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on Monday to Friday from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SWS


STEPHEN W. SMOOT
PRIMARY EXAMINER